DOCUMENT RESUME

ED 203 008 CE 028 893

AUTHOR Fox, Robert D.
TITLE Current Action Principles and Concepts from Research and Theory in Adult Learning and Development.
PUB DATE May 81
NOTE 20p.: Paper presented at the spring meeting of the Society of Medical College Directors of Continuing Medical Education (Columbus, OH, May 17, 1981).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Adult Development: Adult Education: *Adult Learning: *Educational Needs: Educational Research: *Educational Strategies: *Educational Theories: Intellectual Development: Intelligence: Medical Education: Needs Assessment: *Physicians: *Professional Continuing Education: School Role: State of the Art Reviews: Teacher Role

ABSTRACT

The action principles and concepts developed in the field of adult education may be generalized to include the practice of continuing medical education. A review of learning theory and research reveals that adult learning varies along four dimensions: (1) ability to accept new information and adopt new practices; (2) approach to learning; (3) ways of processing information; and (4) way of thinking. In all these dimensions adult learning is characterized by a dynamic tension between stability and change in physical condition role requirements, personality, and social context of the adult. Learning is viewed as the primary means by which the tension and anxiety characteristic of adult development is resolved. Consequently, the action principles and concepts proposed in adult education literature focus on the role of the adult and continuing medical educator in facilitating the reduction of this tension in adults through provision of systematic learning activities. Continuing medical educators may adopt these principles of adult education to the specific developmental needs of physicians and must replicate them only when they clearly do not apply to the practice of continuing medical education or when no action principle for a continuing medical education problem exists. (MN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED203008

Current Action Principles and Concepts from Research and Theory in Adult Learning and Development

Robert D. Fox

Presented to Society of Medical College Directors of Continuing Medical Education
May 17, 1981

CE 028 823

U S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Robert D. Fox

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

The distinction between action principles and scientific principles is a function of the distinction between science and practice [1]. The scientist seeks knowledge so that events may be explained or predicted. The practitioner accepts the general principles of science, converts them to guidelines for behavior, and applies them to problems and events encountered in practice. Like the scientist, the practitioner employs the hypothesis as an operational definition of his conceptual model and chooses a course of action which reflects both the conceptual model and the practice problem. However, rather than employing scientific principles as direct guides for the conduct of practice, the practitioner uses less abstract and more specific action principles to guide performance.

For example, surgery represents a body of action theory based upon predictable relationships among categories of action and their consequences. The action theory of the surgeon is based upon scientific principles communicated to physicians in courses such as anatomy and physiology. As the surgeon practices his profession, he does not depend directly upon the abstract information gained in the study of anatomy; rather, he depends upon the theories of

---

1. This distinction is borrowed from Theory in Practice: Increasing Professional Effectiveness by Chris Argyris and Donald A. Schon.

action which associate surgical procedure A with health outcome B. Thus, the operation conducted by the surgeon is based upon a set of action principles which, in turn, are based upon the scientific principles and concepts from the basic sciences.

Continuing medical education is a type of adult education. As such, it draws heavily upon the action theory prescribed in adult education literature. However, adult educators and continuing medical educators don't always reach back to the basic theory and research to support the principles of adult continuing medical education. The purpose of this paper is to identify some of the prescriptions for the practice of continuing medical education in terms of their bases in research and theory in adult learning and development. Necessarily, this analysis must be limited in scope since the complexity of both the literature of adult education and the research in its foundation sciences of psychology, sociology, social psychology are complex and varied. Rather than attemping to map the broad intellectual territory of either adult education or the basic social sciences, this paper will select several critical action principles of adult education and relate those principles to research and theory in basic social and behavioral science.

Before one may discuss adult learning and its implications for continuing medical educators, some general descriptions of

what adult learning is must be noted. For the purposes of this paper, learning is defined as changing attitudes, levels of knowledge and/or skill which may lead to changes in manifest performance, which, in turn, have social, psychological, economic or spiritual consequences for an adult.

It is also necessary to make an assumption about adult learning; learning is viewed as a natural and inevitable part of adult life. This assumption is supported by more than 30 replications of Allen Tough's (1978) work on self-directed learning projects of adults. One of the major findings of this work is that 93% of all adults regardless of social or demographic variables engage in at least one major learning project per year. Moreover, most of these learning activities occur independently and informally. For adult and continuing educators the significance of this research is clear; adults will learn with or without our assistance.

Learning for adults may be thought of as varying along four dimensions (Knox, 1978):

1. Ability to learn -- adults, like youth, vary in their ability to accept new information and adopt new practices. These differences are related to combinations of social, psychological and physiological factors.

2. Adults differ in their approach to learning -- adulthood may be characterized by an increasing differentiation rather than increasing similarity among individuals. Learning for adults has many functions. This mix of different individuals learning for different purposes makes approach to learning an important variable in the design of learning experiences for adults.

3. Adults differ in the ways they process information -- physiological and social factors have a great impact on the way adults accumulate, store and retrieve information. The factors at work in the gathering, storing and retrieving of information have important implications for the practice of adult and continuing medical education.

4. Adults differ in the way they think -- the way adults acquire content, their cognitive style and their orientation towards achievement have strong effects on their learning behavior and their performance.

Adult learning theory and research in each of these four major areas have significant implications for the practice of continuing medical education and form part of the foundation upon which action theories utilized by adult and continuing medical educators are developed.

Ability to Learn

A major question psychologists and adult educators have asked in their research is: "Can adults learn as well as youth"? Answering this question has been a major goal of many studies of adult learning over the past 15 years. Early research directed towards measuring the capacity of adults to learn seemed to indicate that adults could not learn as well as youth, while later research directed towards assessing the learning performance of adults usually indicated that adults perform consistently and without significant decline until and beyond mid 60's (Hultsch, et al., 1981,

p. 158-159). This apparent contradiction in the research led to a review and reconsideration of methodologies used to study adult learning. Recently, recognition that age cohorts evidence different abilities to learn has led to the initiation and analysis of longitudinal studies as a primary means for determining the ability of adults to learn. Cross sectional studies of the past have compared individuals of varying ages at the same point in time, ignoring the impact of early education and general progress in society (Baltes, Cornelius and Nesselroade, 1979). With the advent of longitudinal research on adult learning, including intelligence test readministration, most psychologists and adult educators assert that intelligence and learning performance remain stable between 20 and 50 years of age (Lachman, et al., 1979). As these studies continue, more information about learning ability in old age will become available. However, analysis of data has indicated that the most significant factor in maintaining or losing ground in level of learning performance is the health of the learner. From approximately the age of 35 to 80, the gap between the learning performance of the ill declines significantly from that of the very healthy adult (Knox, 1978).

One of the most significant lines of research and theory carried out in regard to ability to learn in adults has focused on the influence of fluid vs. crystallized intelligence (Horn, et al., 1980). Fluid intelligence relates strongly to the neurophysiology

of the adult

concept forma

fluid intelli

tallized inte

individual ra

ligence opera

ceive relatio

an intellectu

tallized beca

builds upon p

and crystalli

problems for

As Figur

physiological

intelligence

tion of the i

tallized and

slow eventual

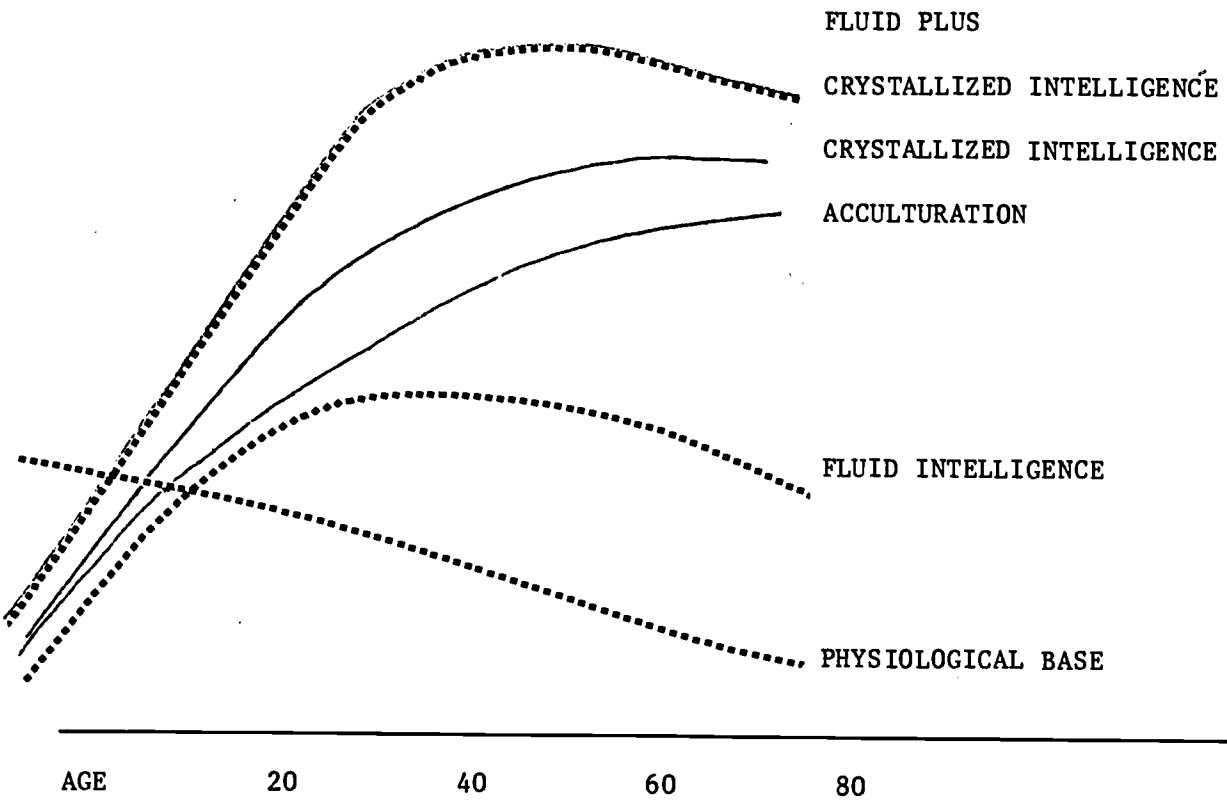
Baltes, 1970).

: and is indicated by capacities in short-term memory,
ıation and abstract reasoning. It is referred to as
.igence because it "flows into all situations". Crys-
elligence is a function of the acculturation of the
'ather than the neurophysiology. Crystallized intel-
'ates in terms of the ability of the individual to per-
.onships and to reason formally and abstractly within
ual and cultural context. It is referred to as crys-
ause it is bound to a social and cultural context and
previous experience. Together, fluid intelligence
ized intelligence operate in the mastery of learning
adults.

re 1 indicates, fluid intelligence declines as the
l base of the individual declines, while crystallized
increases with age just as the extent of acculturа-
individual increases. The combined effect of crys-
fluid intelligence accounts for the leveling and
l decline of learning ability over time (Goulet and
).

FIGURE 1. FLUID AND CRYSTALLIZED INTELLIGENCE:

RELATED VARIABLES AND AGE TRENDS



SOURCE: Knox (1978)

This relationship between fluid and crystallized intelligence has several implications for adult and continuing medical educators. First and foremost, it implies that adults can learn as effectively as youth. Secondly, the role of growing acculturation as a factor

in maintaining high learning ability asserts that adults depend on experience and social context for learning performance. Consequently, learning experiences in adult and continuing education should be presented in ways which simulate the context of application and build upon the social and cultural experience of the learner.

Approach to Learning

The work of Houle (1979) and, more recently, the research of Cervero (1981) have indicated the different approaches to learning which adults, in general, and physicians, specifically, may have as they enter the learning environment. Houle (1978) identified three major categories of reasons for engaging in adult and continuing education:

1. Goal oriented -- many adults see learning as a means to a specific goal in their personal or professional lives.

2. Learning oriented -- many adults enjoy learning and do not discriminate as carefully as goal-oriented learners among different subjects for learning. For example, many physicians attempt to learn about areas of medicine that are outside their practice "to stay sharp" or "because that interests me".

3. Activity and context oriented -- many adults engage in organized educational activities because they are educational activities. Stated differently, many adults enjoy being in an educational environment and associating with other peers. Their primary motivation for attending a C.M.E. program may be the opportunity to exchange stories with fellow physicians.

A second major difference discovered in research on the approaches of adults to learning focuses on the expectations of the learner regarding the learning experience (Craik, 1968, Rabbitt, 1968). Basically, findings from this line of research indicate that adults enter learning experiences with an expectation of either a quality experience or a quality outcome. This factor is critically important in education, such as C.M.E., which is directed towards manifest performance (Knox, 1978).

Findings and conclusions in those who have studied the approach to learning of adults have several implications for the action theory which guides adult and continuing medical educators:

1. Adult and continuing medical educators can help learners make good decisions about the appropriateness of a learning experience by providing a model of what the learner should know (Knowles, 1980). Often referred to as a competency model, this description helps the learner clarify the relationship between his orientations and expectations and the kind of learning experience being offered.

2. Adult and continuing educators should attempt to assess the cognitive maps of participants during the planning stages and during the conduct of the learning experience to insure that the actual orientations and expectations of the learner are considered in the design and conduct learning experience (Knox, 1978).

In both research and medical practice informed consent is sometimes viewed as an unnecessary, or, at best, troublesome procedure. However, in adult continuing medical education the in-

formed consent of those engaging in our programs involves not only the ethical issue of providing the services needed, but also the necessary establishment of a link between what we are attempting to do through programs and the current status and orientation of the learner. In effect, by providing learners with models of what they should know and by being aware of what they presently know and can do, new learning is integrated into previous experience.

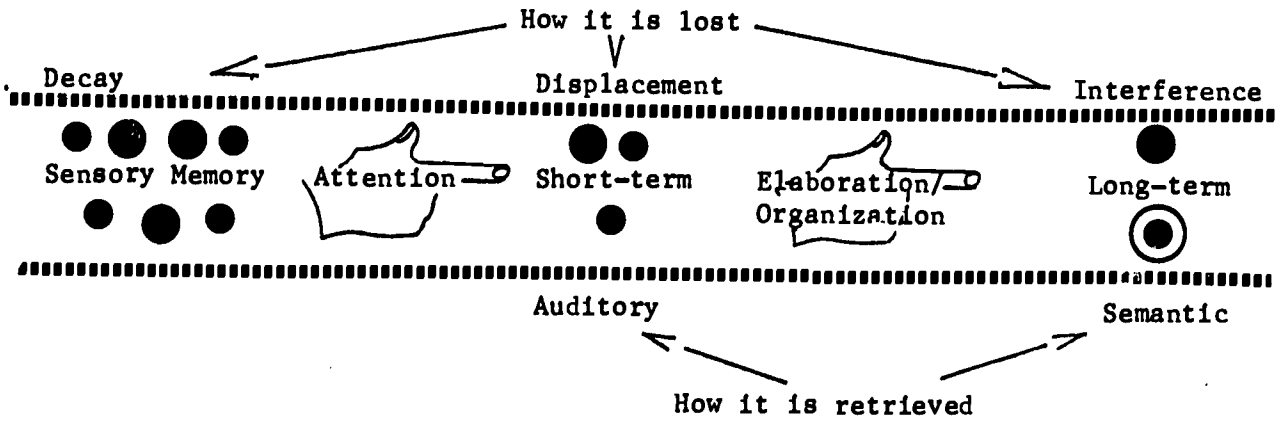
Information Processing and Retrieval

Another important area of research in adult learning and development has focused on the ability of adults to process and retrieve information. Figure 2 shows how information is processed and retrieved and identifies some factors which may inhibit or enhance this process. Three major units are involved in information processing: the sensory memory, the short-term or primary memory and the long-term or secondary memory. Information is picked up by the sensory memory and decays rapidly unless attended to by the learner. If attended to, the information is stored in the short-term memory where it may be recalled for a short period of time or it may be displaced by other information. If the learner elaborates the information and organizes it into his cognitive map, it transfers to the long-term memory. The success of this transference and retention is effected by the extent to which this new information is interfered with by previous information in the long-

term memory. The extent to which the learner is able to recall information from this long-term memory depends upon the extent to which stimulus involved in retrieval is meaningful in terms of learner's organization of the long-term memory (Hultsch, 1981).

FIGURE 2*

Information Processing and Retrieval Model



*Adapted from Hultsch, 1981.

This model for information processing describes the acquisition of information regardless of point within life span of the individual. However, adulthood differs significantly from youth in terms of how parts of the model operate.

Research indicates that there is little or no difference between adults and youth in the functioning of either sensory memory or short-term memory. However, in regard to the long-term memory,

adults' capacities are reduced, primarily because adults use strategies for elaborating and organizing information more poorly than youth. Adults tend to find a limited number of strategies which appear to work well and to employ those strategies throughout life, even in the face of failure (Craik, 1977). Formal training may have significant impact on the range of elaboration and organization strategies used in information processing. Undergraduate medical education, for example, may focus learners on a fairly limited number of mechanisms for elaborating and organizing information into the long-term memory. In effect, this may limit the capacities of physicians to continue their own education.

This model has significant implications for those engaged in adult and continuing medical education:

1. Pacing -- because of differentiation in the ability of adults to process information and complexities involved in elaboration and organization in information processing, different amounts of time may be required for learners to process similar bits of information. Clearly, uniform didactic procedures such as lectures do not consider pacing requirements necessary for information processing in adults (Knox, 1978).

2. Sequence, continuity and integration -- because of the important role of the cognitive map of learners and the elaboration, organization strategies employed by adult learners, the adult continuing medical educator must design learning experiences which reinforce previous learning, which build upon the existing experience and understanding of the learner and which integrate new information into the cognitive map of the learner (Fox, 1979).

3. Interference -- the adult continuing medical educator must recognize that previous learning may interfere with processing new information. Consequently, attention must be paid to unlearning old information while new information is presented.

4. Contextual cues -- adult and continuing medical educators must recognize that the adult learner may have trouble organizing and incorporating new information into their preexisting data bank. Consequently, the use of cues which relate to the learner's existing cognitive map and the new information assists the learner in organizing materials (Hultsch, 1981).

5. Experience -- the adult learner generally comes to an educational program from an experiential base. Relating new information to the experiential base of the adult learner facilitates the organization and the attribution of meaning to new information, and, thereby, increases the likelihood that new information will be recalled in the practice context (Hultsch, 1981).

Ways of Thinking

Thinking may be described as how the adult learner employs creativity, problem-solving and critical thinking in his daily life. Research in thinking in adults has focused on three areas: content acquisition, cognitive or learning styles and achievement. Research and content acquisition in adults indicates that more than youth, adults persist in employing old strategies for problem-solving when new ones may be more appropriate. This area of research is new and poorly developed at this point. However, the limited number of longitudinal studies indicate that differences

are slight. More optimistically, research on critical thinking seems to indicate that the ability of adults to interpret data and to think deductively probably increases naturally over time as the adult gains experience and information about the cultural and social context (Knox, 1978).

Cognitive or learning styles' theory and related research has indicated that learning requires abilities which are at polar opposites. Learners may depend consistently upon concrete experience or abstract conceptualization on one dimension and reflective observation or active experimentation on the other dimension. Kolb (1974) asserts that typically learners develop learning styles, stable patterns of coping with this conflict. These learning styles appear to be fairly consistent throughout much of adult life, changing only in advanced age.

To this point, the use of learning styles for the planning and implementation of adult and continuing medical education programs is unclear. However, research in this area continues and appears to be promising for future developments.

Research and theory on thinking and achievement is also embryonic. It appears that achievement in adults is most directly related to how consistent learning opportunities are with the adult's image of what he or she should know or be able to do. These observations reinforce other research referred to in sections on information processing and approaches to learning.

Research and theory in how adults think is promising for the future, but disappointing for the present. Because of the nature of the phenomena being investigated, clear theoretical models and sophisticated analytical procedures are missing. Fortunately, researchers continue to investigate these areas in the hopes of discovering more about creativity, problem-solving and critical thinking in adult life. At this point, it may be premature to assert action principles for adult and continuing medical educators based on the limited research foundation.

Summary

Within this paper, four dimensions of adult learning have been reviewed, and action principles have been deduced from research findings and conclusions. Probably, the most important general conclusion one may draw from this line of research is that adult development is indeed different from development in youth. The dominant theme of literature in child development has focused on a physical and psychological maturation process. Generally, studies in the psychology and physiology of child development have viewed maturation as the goal of the development process. However, researchers and theorists in adult learning and development assert that the developmental perspective applicable to children is not applicable to adults. Rather, adult development is characterized by a dynamic tension between stability and change in physical

condition role requirements, personality and social context of the adult (Knox, 1978). Learning is viewed as the primary means by which the tension and anxiety characteristic of adult development is resolved. Consequently, the action principles and concepts proposed in adult education literature focus on the role of the adult and continuing medical educator in facilitating the reduction of this tension in adults through the provision of systematic learning opportunities.

The physician encounters tension between stability and change like any adult. Continuing Medical Educators will serve the physician by adapting the action principles and concepts of adult education to continuing medical education and the specific developmental needs of physicians. This means that the scientific findings underpinning the action principles of adult education may need to be replicated only when these action principles and theories clearly do not apply to the practice of continuing medical education or when no action principle for a specific C.M.E. problem exists. Otherwise, the action principles and concepts developed in the field of adult education may be generalized to include the practice of continuing medical education to the same extent that the basic research and theory of adult development is generalized to include physicians.

REFERENCES

1. Argyris, Chris, and Donald A. Schon, Theory in Practice: Increasing Professional Effectiveness. 1974. Jossey-Bass, Inc., San Francisco.

2. Baltes, P.B., Cornelius, S.W. and Nesselroade, J.R., "Cohort Effects and Developmental Psycholcgy". In J.R. Nesselroade and P.B. Baltes (Eds.), Longitudinal Research in the Study of Behavior and Development. 1979. Academic Press, New York.

3. Cervero, Ronald M., "A Factor Analytic Study of Physicians' Reasons for Participating in Continuing Education". Journal of Medical Education, Volume 56, Number 1. 1981.

4. Craik, F.I.M., "Age Differences in Human Memory". In J.E. Birren and K.W. Schaie (Eds.), Handbook of the Psychology of Aging. 1977. Van Nostrand Reinhold; New York.

5. _____, "Short-Term Memory and the Aging Process". In G.A. Talland (Ed.), Human Aging and Behavior. 1968. Academic Press, New York.

6. Fox, R.D., and Boone, E.J., "Building Behavioral Science Curricula in Community Colleges". Community College Review, Volume 6, Number 4. Spring, 1979.

7. Goulet, L.R., and Baltes, P.B. (Eds.), Life Span Developmental Psychology: Research and Theory. 1970. Academic Press, New York.

8. Horn, J.L., and Donaldson, G., "Cognitive Development II: Adulthood Development of Human Abilities". In O.G. Brim, Jr., and J. Kagan (Eds.), Constancy and Change in Human Development: A Volume of Review Essays. 1980. Harvard University Press, Cambridge.

9. Houle, C.O., Continuing Learning in the Professions. 1980. Jossey-Bass, San Francisco.

10. Hultsch, D.F., and Deutsch, F., Adult Development and Aging: A Life Span Perspective. 1981. McGraw-Hill, New York.

11. Knowles, Malcolm S., The Modern Practice of Adult Education: From Pedagogy to Andragogy. 1980. Association Press, Chicago.

12. Knox, A.B., Adult Development and Learning. 1978. Jossey-Bass Publishers, San Francisco.

13. Kolb, D., Learning Style Inventory Technical Manual. 1976. McBer and Company, Boston.

14. Lachman, J.L., Lachman, R., and Thronesbery, C., "Metamemory Through the Life Span". Developmental Psychology, Volume 15, 1979.

15. Rabbit, P., "Age and the Use of Structure in Transmitted Information". In G.A. Talland (Ed.), Human Aging and Behavior. 1968. Academic Press, New York.

16. Tough, A., "Major Learning Efforts: Recent Research and Future Directions". Paper presented at 19th Annual Adult Education Research Conference. 1978. San Antonio, Texas.

18/D
5/7/81